

AMENDMENTS TO THE SPECIFICATION

Please amend the Title of the application beginning at page 1 as follows:

ELECTRODE FOR FUEL CELL HAVING A CATALYST LAYER AND GAS  
DIFFUSION LAYER STACKED ON THE CATALYST LAYER FUEL CELL

Please amend the specification beginning at page 1, line 22 as follows:

Among the fuel cells, in recent years, a polymer electrolyte fuel cell in which a proton exchange ~~membrane~~ membrane is used as the electrolyte has attracted attentions in that operation is possible at a low temperature and with a superior performance.

Please amend the specification beginning at page 1, line 26 as follows:

In the polymer electrolyte fuel cell, in order to secure ion conductivity of the proton exchange ~~membrane~~ membrane at the time of the operation, a proton exchange ~~membrane~~ membrane needs to be humidified.

Please amend the specification beginning at page 5, line 7 as follows:

According to another aspect of the present invention, there is provided a fuel cell comprising: a cell including a proton exchange membrane, an anode in which a catalyst layer is stacked on a gas diffusion layer and whose catalyst layer is disposed on one surface of the proton exchange ~~membrane~~ membrane, and a cathode in which the catalyst layer is stacked on the gas diffusion layer and whose catalyst layer is disposed on the other surface of the proton exchange ~~membrane~~ membrane; a first plate which is disposed opposite to the gas diffusion layer of the

anode and via which a fuel gas supplied to the anode is circulated; and a second plate which is disposed opposite to the gas diffusion layer of the cathode and via which an oxidant gas supplied to the cathode is circulated and which holds the cell together with the first plate, wherein the above-described electrode for the fuel cell is used in at least one of the cathode and the anode.

Please amend the specification beginning at page 6, line 26 as follows:

For each cell unit 100, a cell 10 constituted of an anode 20 formed on one surface of a proton exchange ~~membrane~~ membrane 11 and a cathode 30 formed on the other surface is held between a separator plate 40 in which anode-side channels 41 are formed (in FIG. 1, the anode-side channels 41 are not seen because the channels are disposed in a rear surface of the separator plate, and therefore refer to FIG. 2) and a separator plate 50 in which cathode-side channels 51 are formed. In this constitution, gaskets 60, 70 are disposed to seal between outer peripheral portions of the proton exchange ~~membrane~~ membrane 11 and those of the separator plates 40, 50.

Please amend the specification beginning at page 7, line 10 as follows:

The proton exchange ~~membrane~~ membrane 11 is a thin film formed of a cation-exchange resin (perfluorocarbon sulfonic acid), and is, for example, a Nafion film (Du Pont K.K.).

Please amend the specification beginning at page 7, line 13 as follows:

Both the anode 20 and the cathode 30 have a structure in which a catalyst layer formed of carbon carrying a platinum-based catalyst, and a gas diffusion layer including carbon particles

charged in carbon paper subjected to a water-repellent treatment are stacked, and the structure is closely attached and molded onto a middle portion of the proton exchange ~~membrane~~ membrane 11 by hot press.

Please amend the specification beginning at page 8, line 15 as follows:

Moreover, the fuel gas supplied to the manifold for supplying the fuel gas is distributed into the respective anode-side channels 41 and supplied to the anode 20. This fuel gas is humidified by a humidifying device (not shown), and the proton exchange ~~membrane~~ membrane 11 is wetted by moisture contained in this fuel gas.

Please amend the specification beginning at page 9, line 11 as follows:

The fuel gas supplied to the anode-side channels 41 is passed through a gas diffusion layer 22 of the anode 20, and is used in reaction ( $2\text{H}_2 \rightarrow 4\text{H}^+ + 4\text{e}^-$ ) in a catalyst layer 21. A part of moisture contained in the fuel gas is transmitted through the gas diffusion layer 22, catalyst layer 21, and proton exchange ~~membrane~~ membrane 11, and moves toward the cathode 30.

Please amend the specification beginning at page 11, line 3 as follows:

In the anode 20 and cathode 30, the layer is held in the middle portion of the proton exchange ~~membrane~~ membrane 11 and closely attached/molded by the hot press on conditions at  $120^\circ\text{C}$ . and  $50\text{ kgf/cm}^2$  to constitute the cell 10.

Please amend the specification beginning at page 10, line 13 as follows:

For the catalyst layer 21 in the anode 20, a mixture obtained by mixing carbon particles 210 carrying a platinum-based catalyst and an ion exchange resin 211 is formed in layers on the surface of the gas diffusion layer 22. For the gas diffusion layer 22, holes in porous carbon paper 220 subjected to the water-repellent treatment using a fluorocarbon resin are filled with a mixture of carbon particles 221 and a water-repellent resin 222.

Please amend the specification beginning at page 10, line 21 as follows:

Moreover, the catalyst layer 31 in the cathode 30 also has a constitution similar to that of the anode 20. A mixture obtained by mixing carbon particles ~~[[310]]~~ 313 carrying the platinum-based catalyst with the ion exchange resin 311 is formed in the layers on the surface of the gas diffusion layer 32. For the gas diffusion layer 32, the holes in the porous carbon paper 320 subjected to the water-repellent treatment are filled with the mixture of carbon particles 321 and the water-repellent resin 322.

Please amend the Abstract of the disclosure at page 19 as follows (a clean version of the abstract appears on the following page):

~~There is disclosed an~~ An electrode for a fuel cell is described in which a catalyst utilization is enhanced, and cell performances such as a cell voltage are enhanced, or a catalyst amount can be reduced. ~~For the electrode for the fuel cell of the present invention, carbon~~ Carbon particles 323 having small particle sizes are charged onto a conventional gas diffusion layer, and accordingly an arithmetic average roughness Ra of an interface 33 between a catalyst layer 31 and a gas diffusion layer 32 is reduced. When the arithmetic average roughness Ra is

**10/724,404**

small, that is, when the catalyst layer 31 is formed on the flat/smooth gas diffusion layer 32, a reaction gas spreads over the thin and uniform catalyst layer 31, and an utilization of the catalyst layer 31 is enhanced.